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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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SMITH, GAMBRELL & RUSSELL, LLP SUITE 3100, PROMENADE II 1230 PEACHTREE STREET, N.E. ATLANTA, GA 30309-3592			HERTZOG, ARDITH E	
			ART UNIT	PAPER NUMBER
			1754	

DATE MAILED: 05/05/2004

Please find below and/or attached an Office communication concerning this application or proceeding...

Office Action Summary	Application No. 10/714,382	Applicant(s) ALT ET AL.	
	Examiner Ardith E. Hertzog	Art Unit 1754	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 November 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) 9 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☒ Claim(s) 3 and 4 is/are objected to.
- 8) ☒ Claim(s) 1-9 are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>11142003</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restriction

1. Restriction to one of the following inventions is required under 35 U.S.C. § 121:
 - I. Claims 1-8, drawn to a process for producing anhydrous alkali sulfide by spray drying, classified in class 423, subclass 566.2.
 - II. Claim 9, drawn to a device for performing the process according to claim 1, classified in class 34, subclass 576+.
2. Inventions I and II are related as process and apparatus for its practice. The inventions are distinct if it can be shown that either: (1) the process as claimed can be practiced by another materially different apparatus or by hand, or (2) the apparatus as claimed can be used to practice another and materially different process. See MPEP § 806.05(e). In this case, the process as claimed can be practiced by another materially different apparatus, as evinced by claim 1 wherein no **specific** spray drying apparatus is required.
3. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, **and** because the search required for Group II is not required for Group I, restriction for examination purposes as indicated is proper.
4. During a telephone conversation with Robert G. Weilacher on April 28, 2004, a provisional election was made **with** traverse to prosecute the invention of Group I, claims 1-8. Affirmation of this election must be made by applicant in replying to this

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Office action. Thus, claim 9 is withdrawn from further consideration by the examiner, per 37 CFR § 1.142(b), as being drawn to a non-elected invention.

5. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR § 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR § 1.48(b) and by the fee required under 37 CFR § 1.17(i).

Priority

6. Acknowledgment is made of applicant's claim for priority under 35 U.S.C. § 119(a)-(d); the certified copy of the prior foreign application has been received.

Information Disclosure Statement

7. Acknowledgment is made of the information disclosure statement (IDS) filed November 14, 2003. The submission is in compliance with the provisions of 37 CFR § 1.97. Accordingly, the information disclosure statement has been considered by the examiner.

Minor Informalities

8. The title of the invention is not considered descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed. While applicant is

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free to craft his own title, the following title is suggested: "SPRAY DRYING PROCESS FOR PRODUCING ANHYDROUS ALKALI SULFIDE".

9. The disclosure is objected to, because of the following minor informalities:
 - a. In claims 1 and 5, it is suggested that a comma be inserted after "water of crystallisation melt" for clarity.
 - b. Also in claim 5, it is suggested that a comma be inserted after "and mixtures thereof" for clarity.
 - c. Further in claim 5, in the last line, it is suggested that "vapor" be replaced with "vapour" for consistency with the rest of the claims.

Appropriate correction of all the above is required.

Claim Objections

10. Claims 3 and 4 are objected to under 37 CFR § 1.75(c), as being of improper dependent form, for failing to further limit the subject matter of a previous claim.

Applicant is required to cancel the claims; amend the claims to place the claims in proper dependent form; or rewrite the claims in independent form. Claim 3 states "wherein inert gas in stationary operation is avoided"; claim 4 states "the use of inert gas in stationary operation is avoided." **However**, both claims depend upon claim 1 which explicitly **requires** the presence of "inert drying gas" in applicant's spray drying process.

In other words, as stated in MPEP § 608.01(n), III:

The test for a proper dependent claim under the fourth paragraph of 35 U.S.C. § 112 is whether the dependent claim includes every limitation of the claim from which it depends. The test is not one of whether the claims differ in scope. Thus, for example, if claim 1 recites the combination of elements A, B, C, and D,

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a claim reciting the structure of claim 1 in which D was omitted or replaced by E would not be a proper dependent claim, even though it placed further limitations on the remaining elements or added still other elements.

Examiners are reminded that a dependent claim is directed to a combination including everything recited in the base claim and what is recited in the dependent claim. It is this combination that must be compared with the prior art, exactly as if it were presented as one independent claim.

See also MPEP § 608.01(n), II. As already noted, appropriate correction is required.

Claim Rejections - 35 U.S.C. § 112

11. The following is a quotation of the second paragraph of 35 U.S.C. § 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

12. Claim 2 is rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Said claim is considered vague, indefinite, and/or confusing, because it is not clear if “further comprising drying” means drying **in addition to** that recited in claim 1 (upon which claim 2 depends) or, alternatively, simply to the “drying” of claim 1. If the latter is intended, it is suggested that claim 2 be revised to use language like claim 6, i.e., by replacing “further comprising drying” with “wherein that drying is performed”. Appropriate correction is required.

Claim Rejections - 35 U.S.C. § 102

13. The following is a quotation of the appropriate paragraphs of 35 U.S.C. § 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

14. Claims 1 and 2 are rejected under 35 U.S.C. § 102(b) as being anticipated by Abraham et al. (WO 01/25416 cited by applicant). Abraham et al. teach methods of preparing anhydrous alkali metal sulfides by spray drying (see Abraham et al. abstract). In every embodiment (example) disclosed by Abraham et al., anhydrous sodium sulfide is produced by spray drying an aqueous composition comprising various forms of sodium sulfide (specifically, aqueous compositions of: sodium hydrosulfide; sodium monosulfide; sodium disulfide; and sodium tetrasulfide—i.e., “alkali sulfide” compositions within the scope of the instant claim 1 Markush group) using nitrogen gas (i.e., “inert drying gas” per instant claim 1) at substantially atmospheric pressure (i.e., pressure limitations within the scope of instant claim 2) (see Abraham et al. embodiments, beginning at p. 13, line 5, and ending at p. 15, line 23). It is appreciated that instant claim 1 requires that applicant’s “inert drying gas” be “loaded with water vapour”. And, as explicitly taught by Abraham et al., the “second inert gas stream”—that which is formed in the chamber of the spray dryer, where, clearly, spray drying occurs, contains “water which is typically in the form of vapor or gas” (see p. 9, lines 24-27, in concert with sentence bridging pp. 11-12). Thus, Abraham et al. anticipate applicant’s claims 1 and 2, in that spray drying processes for producing anhydrous sodium sulfide which, at least inherently, meet all corresponding claim limitations are **exemplified**. Again, it is emphasized that the presence of the Abraham et al. “second inert gas stream”, which **explicitly** contains water vapor, within the chamber of the spray dryer wherein anhydrous sodium sulfide is formed, is considered to at least

inherently meet applicant's "inert drying gas loaded with water vapour" requirement, as broadly recited in instant claim 1.

Claim Rejections - 35 U.S.C. § 103

15. The following is a quotation of 35 U.S.C. § 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

16. Claims 3-8 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Abraham et al. Abraham et al. are relied upon as set forth in paragraph 14. above, anticipating both applicant's independent claim 1 (upon which claims 3 and 4 depend) and claim 2. With respect to applicant's independent claim 5 and claim 6, it is noted that these claims are the same as instant claims 1 and 2 **except** that a **specific** "water vapor load" is required. Thus, Abraham et al. only fail to anticipate instant claims 5 and 6, in that the **amount** of water vapor in each exemplary "second inert gas stream" is not disclosed (see again Abraham et al. embodiments, beginning at p. 13, line 5, and ending at p. 15, line 23). However, it would have been obvious to one of ordinary skill in the art, at the time the invention was made, to have determined optimal amounts of water vapor within the Abraham et al. "second inert gas stream[s]", because, again, Abraham et al. clearly teach that water vapor is present in these inert gas streams, **and**, absent contrary evidence (see discussion of applicant's comparative data in paragraph 17. below), optimization of any result-effective variable taught therein is considered to

have been within the level of ordinary skill (see p. 12, last paragraph, wherein Abraham et al. state that “operation of a spray dryer as represented in Figure 1 can be optimized by controlling or selecting the rates, temperatures and compositions... of the feed streams going into the spray dryer”). See MPEP § 2144.05, II and III. With respect to instant claim 7, if the various exemplary aqueous sodium sulfide compositions of the Abraham et al. embodiments do not inherently meet the instantly recited formula requirements, then such formulae are at least generally disclosed by Abraham et al. (see p. 1, lines 16-24, and paragraph bridging pp. 7-8), thereby having rendered their use within the Abraham et al. spray drying processes *prima facie* obvious. With respect to instant claim 8, note that in each Abraham et al. embodiment an aqueous sodium sulfide “composition is atomized and brought into contact with a hot gas stream of the inert drying gas”, as broadly recited therein. Finally, concerning instant claims 3 and 4, it is again noted that these claims appear to conflict with applicant’s independent claim 1, given that they seemingly exclude the use of the “inert drying gas” required by instant claim 1 (see related objection in paragraph 10. above). However, based upon careful review of applicant’s disclosure as a whole—particularly the drawings—it is believed that these claims are intended to cover gas recycling operations in accordance with instant Figure 2. Abraham et al. cannot be considered to anticipate instant claims 3 and 4, in that processes wherein the inert gas drying stream is recycled are not **exemplified**. However, Abraham et al. do teach that the inert gas stream which remains after removal of the solid particulate anhydrous alkali metal sulfide “may optionally be further processed and recycled” (see p. 10, lines 1-3, 20-23). Specifically,

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“the water vapor... may be removed by known means of dehydration” and the resultant “inert gas stream may then be recycled...” (see p. 10, lines 23-27; see also p. 12, lines 17-20), i.e., steps considered to be within the intended scope of instant claims 3 and 4. Therefore, it would have been obvious to one of ordinary skill in the art, at the time the invention was made, to have utilized gas recycling within the Abraham et al. processes, because, as just discussed, gas recycling is clearly within the broad disclosure of Abraham et al., **and** because the efficiency benefits of recycling **any** chemical processing stream, whenever possible, are considered to have been well known in the art. “A reference may be relied upon for all that it would have reasonably suggested to one having ordinary skill in the art, including nonpreferred embodiments. *Merck & Co. v. Biocraft Laboratories*, 874 F.2d 804, 10 USPQ2d 1843 (Fed. Cir.), cert. denied, 493 U.S. 975 (1989)” (see MPEP § 2123).

Comparative Data

17. The comparative data presented in applicant's specification have been carefully reviewed. However, they cannot be considered sufficient to overcome the *prima facie* case of obviousness set forth above, in that they do not appear to be within the scope of the instant claims; “objective evidence of nonobviousness must be commensurate in scope with the claims which the evidence is offered to support” (see MPEP § 716.02(d)). Specifically, the “Examples” of Table 1 (see p. 7 of the instant specification) appear to use **only** “Water vapour” as the “Drying gas” (see especially p. 7, lines 10-11, as well as the sentence bridging pp. 1-2 of the instant specification, wherein applicant

states, "The inert drying gas loaded with water vapour can be **pure** superheated water vapour" (emphasis added)). Yet all instant claims **require** the presence of **at least some** "inert drying gas" (i.e., "nitrogen, helium, argon or a mixture of the cited gases" (see last full sentence on p. 1 of the instant specification)). Furthermore, in Table 1, it is not understood how the "Residual moisture" values for applicant's "Water vapour" examples are significantly different from the "Residual moisture" values for the "Comparative tests". It is respectfully noted that "evidence relied upon should establish 'that the differences in results are in fact unexpected and unobvious and of both statistical and practical significance'" (see MPEP § 716.02(b)).

Conclusion

18. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. These references are considered cumulative to or less material than those discussed above. Note that US 6,503,474 is an equivalent of EP 0 942 156 cited by applicant. Mayers (US 1,946,089) establishes that processes for production of anhydrous sodium sulfide which include at least a drying step have been long known in the art. Scoggin (US 3,786,035) teaches that air or oxygen should be excluded from "reaction media during the preparation and use of alkali metal sulfide reactants... in order to minimize or eliminate the occurrence of alkali metal thiosulfate impurities in alkali metal sulfide reactants" (see col. 1, lines 54-60). The Perry's reference is a newer version of that discussed in Abraham et al. (see p. 3, lines 1-6); note especially Table


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20-29 which establishes that sodium sulfide has been successfully spray dried using air as the drying gas.

19. Any inquiry concerning this communication from the examiner should be directed to Ardith E. Hertzog at telephone number is (571) 272-1347. The examiner can normally be reached on Monday through Friday (from about 8:00 a.m. - 4:30 p.m.).

20. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley S. Silverman, can be reached on (571) 272-1358. The fax phone number for the organization where this application is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. For any questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


AEH
April 30, 2004


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